

Application No. 09/854,718

RD-28013-2

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) A system for the optical interrogation of combinatorial arrays (12), comprising:

a testing device (108) selected from the group consisting of an abrasion testing device, an elongation testing device, solvent exposure testing device, exposure to fluid testing device and a hydrolytic testing device to test a combinatorial array (12);

a combinatorial array (12) having a surface (14) with a plurality of predefined regions, the plurality of predefined regions comprising one or more test result samples and reference regions resulting from testing in the testing device (108);

a radiation source (16) operable, to expose each of the plurality of predefined regions of the combinatorial array (12) to incident radiation (20) of at least one selected wavelength and intensity;

a detector (26) operable to measure resultant radiation (22) for each of the plurality of predefined regions of the combinatorial array (12); and

a computer to functionally control the operation of the system and determine the relative performance of each of the plurality of predefined regions of the combinatorial array (12).

2. (original) The system of claim 1, wherein the sample and one or more of the plurality of predefined reference regions is measured simultaneously.

3. (original) The system of claim 1, wherein the surface (14) of the combinatorial array (12) is concave or convex.

4. (original) The system of claim 1, wherein the combinatorial array (12)

Application No. 09/354,718

RD-28013-2

comprises a substrate with a deposited coating.

5. (original) The system of claim 4, wherein the substrate exhibits inherent luminescence.

6. (original) The system of claim 4, wherein the coating exhibits inherent luminescence.

7. (original) The system of claim 4, wherein the coating comprises a transparent material or an opaque material.

8. (original) The system of claim 4, wherein the coating comprises an organic material or an inorganic material.

9. (original) The system of claim 4, wherein the substrate is comprised of a material selected from the group consisting of plastic, glass, metal, and composite material.

10. (original) The system of claim 9, wherein the plastic comprises a film or plaque.

11. (original) The system of claim 9, wherein the substrate comprises a transparent material or an opaque material.

12. (canceled)

13. (original) The system of claim 1, wherein one or more of the plurality of predefined regions of the combinatorial array (12) further comprises at least one luminescent compound for reacting with the incident radiation.

14. (original) The system of claim 13, wherein the luminescent compound is selected from the group consisting of a luminescent compound which is an organic dye, a luminescent compound which is an insoluble luminescent particle, a nanoparticle, a pigment, a luminescent compound whose emission properties are not affected by the microenvironment, and a luminescent compound whose emission properties are affected by the microenvironment.

Application No. 09/854,718

RD-28013-2

15. (original) The system of claim 1, further comprising a wavelength selection device (18) operable to receive incident radiation (20) and transmit incident radiation (20) having a selected range of wavelengths.

16. (original) The system of claim 1, further comprising one or more filters for selectively absorbing incident radiation (20) of a selected range of wavelengths.

17. (original) The system of claim 1, wherein the wavelength of the radiation is from about 20 nm to about 25,000 nm.

18. (original) The system of claim 1, further comprising an imaging device (34) operable to obtain an image of the resultant radiation (22) for each of the plurality of predefined regions of the combinatorial array (12).

19. (currently amended) A method for optical interrogation, comprising the steps of:

providing a coated substrate;

applying a varying test onto the coated substrate to form an array of combinatorial test result regions, wherein the test is selected from the group consisting of an abrasion test, an elongation test, solvent exposure test, exposure to fluid test and a hydrolytic test;

exposing the array of test result regions to incident radiation (20) of at least one selected wavelength and intensity;

collecting resultant radiation (22) for the regions of the combinatorial array (12);

and determining performance of result regions according to respective resultant radiation.

20. (previously presented) The method of claim 19, wherein the step of applying tests forms test result regions and reference regions.

21. (canceled)

Application No. 09/854,718

RD-28013-2

22. (previously presented) The method of claim 20 wherein the reference regions are substrate regions between result regions.

23. (currently amended) The method of claim 20, further comprising a step of measuring at least a portion of a reference substrate region and at least a portion of at least one result region simultaneously and determining performance using the portion of the reference substrate region as a reference.

24. (previously presented) The method of claim 19, wherein the substrate comprises a deposited coating.

25. (previously presented) The method of claim 19, wherein the substrate is either concave or convex.

26. (original) The method of claim 24, wherein the substrate exhibits an inherent luminescence.

27. (original) The method of claim 24, wherein the coating exhibits an inherent luminescence.

28. (previously presented) The method of claim 19, wherein one or more of the test result regions of the combinatorial array (12) has been physically exposed to at least one test selected from the group consisting of abrasion testing, exposure to temperature, elongation testing, exposure to at least one solvent for a predetermined period of time, exposure to at least one fluid for a predetermined period of time, and subjection to hydrolytic stability testing.

29. (previously presented) The method of claim 19, wherein one or more of the test result regions of the combinatorial array (12) further comprises at least one luminescent compound for reacting with the incident radiation.

30. (original) The method of claim 29, wherein the luminescent compound is selected from the group consisting of a luminescent compound which is an organic dye, a luminescent compound which is an insoluble luminescent particle, a nanoparticle, a pigment, a luminescent compound whose emission properties are not affected by the

Application No. 09/854,718

RD-28013-2

microenvironment, and a luminescent compound whose emission properties are affected by the microenvironment.

31. (original) The method of claim 19, further comprising the step of selectively absorbing incident radiation of one or more predetermined wavelengths.

32. (previously presented) The method of claim 19, further comprising the step of obtaining an image of the resultant radiation (22) for each of the test result regions of the combinatorial array (12).

33. (canceled)

34. (canceled)

35. (canceled)

36. (canceled)

37. (canceled)

38. (canceled)

39. (canceled)

40. (canceled)

41. (canceled)

42. (canceled)

43. (canceled)

44. (canceled)

45. (canceled)

46. (previously presented) A method of testing and interrogating the results of the testing, comprising:

Application No. 09/854,718

RD-28013-2

applying varying testing conditions across a substrate to form a pattern of test results;

exposing the pattern of test results to incident irradiation;

detecting radiation scattered from the pattern of test results; and

referencing detected scattered radiation to a position of a corresponding test result in the pattern to determine a varied testing condition that resulted in the scattered radiation.

47. (previously presented) The method of claim 46, comprising applying the varying testing conditions to form a pattern of test results with intermittent untested reference spacings and detecting radiation scattered from the pattern of test results with the spacings.

48. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating.

49. (previously presented) The method of claim 46, wherein the substrate has an inherent luminescence.

50. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that has an inherent luminescence.

51. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that comprises a transparent material or an opaque material.

52. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that comprises an organic material or an inorganic material.

53. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that is a material selected from the group consisting of plastic, glass, metal, and composite material.

Application No. 09/854,718

RD-28013-2

54. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that comprises a film.

55. (previously presented) The method of claim 46, wherein the substrate comprises a deposited coating that comprises a transparent material or an opaque material.

56. (previously presented) The method of claim 46, wherein the varying testing conditions step comprises testing conditions of a test selected from the group consisting of abrasion testing, temperature exposure testing, elongation testing, solvent exposure testing; fluid exposure testing and hydrolytic stability testing.

57. (previously presented) The method of claim 46, wherein one or more of the test results of the pattern further comprises at least one luminescent compound for reacting with the incident radiation.

58. (previously presented) The method of claim 46, wherein one or more of the test results of the pattern further comprises at least one radiation reactive luminescent compound selected from the group consisting of an organic dye, a luminescent particle, a nanoparticle and a pigment.

59. (previously presented) The method of claim 46, wherein one or more of the test results of the pattern further comprise at least one radiation reactive luminescent compound selected from the group consisting of a luminescent compound with emission properties that are not affected by a microenvironment and a luminescent compound with emission properties that are affected by a microenvironment.